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Contracts, trust and market environment in farmer-buyer relationships

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Abstract:

This study identified and validated key constructs underlying supply chain management research: contract, trust and environment. In total, 22 items were retained to measure six dimensions for the three core concepts. Using data from a sample of Chinese vegetable and fruit farmers, we found empirical support for a complementary relationships between contract and trust. Moreover, our results also indicated a positive relationship between environmental uncertainty and the degree of using contracts.

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1. Introduction

Transaction cost economics(TCE) has emerged as an important framework to understand supply chain governance. Williamson (1991) advanced the transaction cost economics research agenda by distinguishing three generic forms of economic organization – market, hybrid, and hierarchy. The three types of organization form were differentiated by different coordinating and control mechanisms, different type of contract laws, etc. Within this framework, the supplier-buyer relationships shall structure itself in such a way to minimize their transaction costs(Williamson, 1975, 1993). However, TCE has been criticized for its simplicity since it ignored the informal aspects of the relationships (Demsetz, 1988; Ring and van den Ven, 1992 and1994). Nevertheless, the social relationships, such as network and trust, are such important concepts in the Asian culture and should not be excluded when analyzing relationship exchanges here.

In this paper, we seek to combine both TCE theory and relational theory to study the chain governance relationships between small scale producers in China and their buyers. We intend to develop and empirically test a farmer-buyer relationship consisting of two dimensions: contractual governance and relational governance. The traditional contractual governance represents the hard, explicit and formal side of the relationships. Relational governance has also been termed as 'informal self-enforcing governance'(Dyer and Singh, 1998). It represents the soft, normative and informal side of the relationships between farmers and their buyers as well. By using the primary collected data, we empirically test whether trust and contracts operate as complementary or substitutes, as well as their relationships with external market environment.

2. Concepts

Contracts

One important concept in TCE is contracts. Formal contracts are mechanisms that attempt to reduce risk and uncertainty in exchange relationships (Lusch and Brown, 1996). Macneil (1978 and 2000) expanded contracts to refer to relationships between people and he classified three types of contract laws: classical contract law, neoclassical contract law and relational contract law. In relation to Macneil's three-way classification of contracts, Williamson (1996) proposed a schema which match governance structures with commercial transactions. Classical contracting applies to market governance, the main structure for nonspecific transaction. Neoclassical contracting applies to trilateral governance, where occasional transaction of the

mixed and highly idiosyncratic kinds takes place. Relational contracting is relevant to transaction-specific governance, where two types of structures can be distinguished: bilateral governance (obligational contracting) and unified governance (internal organization).

Trusts

In Macneil's relational contracting theory, the concept of contract is expanded to refer to relationships between people who share norms and values. Trust is a key feature in this relational governance. Relational governance mechanisms (such as trust) are regarded as a means to enhance transaction specific investments associated with less monitoring and bargaining (Barney and Hansen, 1994).

Most studies define trust as 'the extent to which a firm believes that its exchange partners is honest and or benevolent.' (Anderson and Narus, 1990) Honest refers to a channel member's belief that one's partner is 'reliable, stands by its word, fulfils promised role obligations and is sincere'. Benevolence is defined as the belief that one's partner is 'genuinely interested in one's interests or welfare and is motivated to seek joint gains.' (Geyskens et al. 1998). Williamson (1993) distinguished another three types of trust according to the objects: calculative trust, personal trust, and institutional (or hyphenated) trust.

A series of research has identified several antecedents and consequences of trusts. Anderson and Narus, (1990) identified and tested three antecedents (cooperation, communication and economic outcomes given comparison levels) and two consequences (conflict and satisfaction) for trusts. Fritz and Fischer (2007) observed that trust is positively effected by quality communication and positive collaboration experience in the past. Lu, et al. (2007a) developed a conceptual model on small holders' personal relationships and their market behavior. They observed that trusted buyer-seller relationship enhanced farmers' participation in modern market outlet (export and supermarket) as well as increased the contracts application. In their meta-analysis, Geyskens, et al (1998) examined 24 studies on trusts and the antecedents and consequences of trust in marketing channels.

Although benevolence and honest are conceptually distinct, most trust studies included one or both aspects of trust in a single, unidimensional measurement(Jap, 2001; Claro et al, 2003; Lu et al. 2007). Only limited studies (Ganesan,1994, Kumar 1995, and Kemp and Ghauri, 2001) successfully developed a multidimensional construct for trust and measured it for its two facts: credibility and benevolence. The question whether researchers need to measure the two facets of trust remains unanswered.

Environment

Environmental factors play a significant role in decision-making uncertainty in marketing channel relationships (Achriol and Stern, 1988).). In a highly instable environment, buyers and sellers may seek to establish certain governance structure in order to manage this turbulent situation better. In the context of supply chain management, Chen and Paulraj (2004) identified three environmental dimensions: supply uncertainty, demand uncertainty and technology uncertainty. Geyskens et al. (1998) grouped environmental uncertainty as environmental diversity (the degree of heterogeneous and complex of environmental elements), environmental volatility

(referring to the rapid changes of market and demand), and environmental munificence (the rich availability of resources.

3. Hypothesis Development

Based on the above literature review, we propose to study the chain governance from two dimensions: contractual governance and relational governance. We define that contractual governance refers to any agreements (both written and oral) reached by parties to reduce risk and uncertainty in exchange relationships. Considering the reality in China, we category two types of contracts, that is marketing contracts and production contracts. Marketing contracts defines buying and selling conditions for the production while production contracts describes more details for the production process. Relational governance refers to parties' informal embedded relationships and will be represented by its main feature: trust.

There is a wide debate over the relationships between contracts and trust. Researchers in economics and sociology have generally been viewed contractual governance and relational governance as substitutes (Larson, 1992). There are compelling arguments for a substitutive relationship between these two governance mechanisms(Dyer and Singh 1998); Gulati (1995) even claimed that ' Cautious contracting gives way to looser practices as partner firms build confidence in each other.' Yu, et al. (2006) found that both formal governance(contractual agreements and financial commitments) and relational governance (trust) mechanisms affects suppliers' tendencies to make specialized investments. They argued that, as firms built up more calculative trust, their partners reduced the dependence on formal governance mechanisms. However, the empirical study from Poppe and Zenger (2002) supported the proposition that formal contracts and relational governance function as complements. These two may coexist and interact with each other. In their China chain study, Lu et al. (2007a and b) confirmed that a positive relationship exist between trust and contractual governance. We believe that relational governance becomes a necessary complements to contracts when change and conflict arise. In particular in the Asian culture, social norms and values are sometime functioning as tacit agreement and binding people's behavior. Thus we hypothesize in the content of Asian culture:

Hypothesis H1: There is a positive relationship between contractual governance and relational governance featured by trust.

Achrol, et al. (1983) argued that cooperation and coordination will increase in a highly uncertain input/output or competitive sector as marketing channel dyads tend to protect themselves by being better organized. In a high degree of uncertain market, buyers and sellers are trying to work together during the difficulty times, such as using contracts to safeguard their business and minimize the impacts of the turbulence from the markets. Thus, we hypothesize a positive relationship between the environmental uncertainty and contractual governance.

H2: The greater the perceived environmental uncertainty, the greater the use of contractual governance.

Geyskens et al. (1998) and Kumar et al. (1995) observed that environmental uncertainty is inversely related to relationship quality and trust. Ganesan (1994) argued that in a severe uncertain environment, channel partners tend to remain flexible and develop temporary relationships and thus exhibits lower trust. However, these studies were based on large companies in western culture, where business relationships were more rooted in the formal, explicit aspects. In the Chinese content, we expect that our target groups, small scale farmers, embrace much more to personal relationship in the uncertainty environments in order to secure their markets. Thus, we also expect a positive impact of environmental uncertain on relational governance.

H3: The greater the perceived environmental uncertainty, the greater the use of relational governance featured by trust..

4. Research Methodology

Concepts such as contracts and trust, by their very nature, are difficult to measure and requires the constructs of proxy variables, or scale development. In order to develop better measurement for a scale, one has to start with the specification of the constructs for its inclusion and exclusion, as well as how many dimensions or components it has based on previous research. Purification is an important process for generating a reliable and validity scale. Besides the traditional measurement of assessing a scale, such as coefficient alpha, item-to-total correlation, and Exploratory Factor Analysis (EPA), contemporary techniques, such as Confirmatory Factor Analysis (CFA) can provide a stricter and more accurate assessment (Segars, 1997).

Based on suggestions from previous research on development of constructs (Churchill, 1979; Koufteros, 1999; Chen and Paulrai, 2004; and Han, et al. 2007), we adapted the following steps in our research:

1. Specify the theoretical framework and identify research constructs
2. Generate items for each construct
3. Data collection
4. Reliability assessment of the constructs
5. Validity and unidimensionality assessment of the constructs
6. Development Norms and test hypothesis

In the next part, we will describe the construct development and data collection procedures. The assessment for reliability and validity will be presented in the analysis results.

Based on the literature review and field survey, we identify two dimensions for the contract construct: marketing contract and production contract. The items from marketing contract was adapted from Lu et al. (2007) since this measurement has been tested in the vegetable sector in China. Since no measurement on production contract can be found from the literature, we developed the items for production contracting based on our field experiences and interviews with practitioners.

Geyskens, et al (1998) acknowledged the challenges of measuring two both aspects of trust since honest and benevolence are so interweaved. Despite the ongoing discussion, we intend to measure the two facets of trust and to examine the benefits of joint measures. Our items of trust in partners' reliability are based on the works from Lu (2007) and Jap (2001) while trust in benevolence is based on the works of Ganesan (1994), Kumar, et al.(1995) and Kemp and Ghauri (2001).

External environment can cover a very broad scope such as macro environment, while we focus our attention to market environment in this study. Based on the work from Claro, et al.(2003), Cannon and Perreault (1999), Ganesan, (1994), and Klein, et al.(1990), as well as the actual situation in the agribusiness in China, we formulated two dimensions (market diversity and market volatility) to study environmental uncertainty.

The questionnaire was pre-tested by apple growers and their buyers in Shandong province by means of focus group discussion, as well as vegetable growers in Hubei provinces. Based on the suggestions from the pretest, some items were added, changed, split, or deleted. At the end, much effort was shifted to the item editing. Each statement was reviewed and assessed by two experienced marketing experts in China so that its wording is as precise as possible. Altogether, 39 items were generated to measure the three constructs (12 items for contracts, 14 items for trust, and 13 for market environment). Questionnaire items are measured in seven-point Likert scale, where 1= completely disagree, 7 = totally agree).

The data collection was carried out by MSc students from Hua Zhou Agricultural University in Hubei Province in October 2008 after they completed a training session. They spent one week in Yichang city to interview vegetable farmers and orange farmers. At the end, 210 questionnaires were obtained.

5. Data Analysis

Reliability, validity and unidimensionality lie at the heart of the instrument development process. Reliability answers the question whether the multi-item scale free from error, or give consistent (repeatable) results. Validity assessment is examining whether the multi-item scale measure what it is suppose to measure. Similar to the concept of reliability, unidimensionality implies that the set of multi-item scale has only one underling concept in common.

Reliability

As our three constructs (contracts, trust and environment) were based on previous research, exploratory factor analysis was first applied to check whether the items fell under the defined constructs. Compared with the less theoretic-driven principle components analysis, exploratory factor analysis discovers more theoretical concept (Lattin, et al. 2003). We first need to purify each scale by eliminating items which has low correlations, communities extracted and item inter-correlation. Negative correlation in the item inter-correction matrix should be discarded first(Chen and Paulraj, 2004). Furthermore, we will use cut-off value of 0.30 to check correlations and communities. The construct for contract turned out to be two factors: marketing contract and production contract. The item for package is deleted due to low

correlation and communities while the item using written contract was loading on production contract instead of on marketing contract. The construct for trust were loading on two factors : trust in reliability and trust in benevolence. However, three items (55, 58, 61 and 62) were deleted due to their negative values in the item inter-correlation matrix and one item(51) were deleted due to lower communities. For the construct market environment, 8 items were deleted due to negative item inter-correlation and low communalities extracted. One of the possible reason is that some statements are too general while farmers are simply agreed upon. The factor loadings for all constructs were presented in the second column in Table 1. All factor loadings were above 0.50, a desirable value for exploratory factor analysis, which may indicate that our three constructs have a good unidimensionality.

Despite its shortcomings, Cronbach's alpha is the most applied index to measure reliability (Hull and Nie, 1981). Typically, the constructs were considered to be reliable if the Cronbach's alpha value was greater than 0.70, or even lower for new scale development (Chen and Paulraj, 2004). As can be seen from Table 1, Cronbach's Alpha values for all constructs were well about the threshold value 0.70 and ranged from 0.725 to 0.899.

Construct validity and unidimensionality

Confirmatory factor analysis (CFA) was applied to evaluate construct validity and unidimensionality. CFA was to test prior notion (regarding which variables load on which factors) about the structure of the factor model (Lattin, et al. 2003). Each item was further examined and deleted if their proportion of variance (R^2) value was less than 0.30 (Chen and Paulraj, 2004). A construct was considered to have convergent validity if all the factor loadings are above this level. Multiple goodness of fit were used to evaluate the tenability of models. The commonly used ones were chi-square statistics, root mean square error of approximation (RSMEA), goodness-of-fit index (GFI), comparative fit index (CFI), Tucker-Lewis index (TLI), Normed fit index (NFI), etc (Joreskog and Sorbom, 1996). Bollen (1989) also suggested that the large the t-values, the strong the evidence that this item represent the underlying concept.

Due to the large number of indicators and the limitation on sample size, three different AMOS measurement models were evaluated (Byrne, 2001; Arbuckle, 2007). The contract measurement model includes factors of marketing contract and production contract. The trust measurement model includes trust in reliability and trust in benevolence. Finally, the market environment model includes environmental diversity and environmental volatility.

The standard coefficients, R^2 and t-value (critical ration in AMOS) from the three measurement models were presented in the last three column in Table 1. Three items from the contract measurement model were deleted due to their low R^2. All retained items were significantly related to their underlying theoretical constructs despite few with lower R^2.

In the CFA, multiple model fit criteria are used to assess the measurement unidimensionality. It is recommended to have the ratio of chi-square to its degree of freedom close to two (Koutfteros, 1999). However, this index is sensitive to sample size and departures from multivariate normality and should be interpreted with cautions (Joreskog and Sorbom, 1996). The other measures of model fit used in this

study include three index recommended above 0.90 (NFI, CFI, TLO or NNFI) and RMSEA (recommended less than .08). As can be seen in Table 1, all measurement models have acceptable fit indices, and consequently satisfy the construct unidimensionality.

Test Hypothesis

In line with the proposed procedures we can come to test hypothesis once the measurement models were established. In the theoretical framework section, three hypotheses were formulated among the relationships contract, trust and market environment. Each concept were captured in two separate factors which were consisting of several formative indicators. Since each indicator contributes to their corresponding construct, we sum up the scores of their indicators to represent the concepts. The results of the hypothesis testing were presented in Table 2. Positive relationships were found between contract and trust, and between market environment and contract. Thus, Hypotheses 1 and 2 were supported. However, a positive relationship between environment and trust were not found although the correlation sign was positive. Consequently, Hypothesis 3 was not supported.

Table 2 Results of Hypothesis testing

Hypothesis	Pearson Correlation	P	Result
H1: contracts and trust (+)	.427**	.000	Supported
H2: environment and contract (+)	.194**	.005	Supported
H3: environment and trust (+)	.092	.185	Not supported

** : correlation is significant at the 0.01 level.

6. Conclusion and Limitations

The relationships between formal contracts and relational governance featured by trust are one of the most significant issues which is debated in the business literature and more recently in supply chain management as well. Our research attempted to contribute empirical results from our primary data to this debate.

First of all, this study identified and validated key constructs underlying supply chain management research: contract, trust and environment. These constructs were identified based on a thorough literature review across diverse disciplines. During the purification process, 14 items were discarded in order to improve the reliability and validity of their underlying constructs. At the end, total 22 items were retained to measure six dimensions for the three core concepts: Contract (marketing and production), Trust (reliability and benevolence), and Environments (diversity and volatility).

Secondly, our finding supported this argument that contracts and trust functions as complements. The cooperation and trust encouraged by relational governance may stimulate contractual refinements that further strengthen greater cooperation. On the other way, well-specified contracts may promote more long-term cooperation and

trusting relationship. The results would provide evidence based support to strategic policy makings for both governments and private sectors. In order to reach the Chinese farmers, it is suggested to combine resources and efforts from both formal, legal perspective as well as social relational network.

The implications of this study could be evaluated in following limitations. First, comparing with the literature review on contract and trust, literature on environments was thinly covered. This fact might lead to the result of a less satisfied measurement model for the construct environment. In the future, more attention should be paid to improve this piece of work. Second, although the test of the models generated a number of results consistent with our hypotheses, the sample data was collected in one region in China, thus limiting the extension and applications of our results. Larger samples and more coverage on different types of locations are encouraged to further investigate these issues.

Table 1 The Final Measurement Instrument for Contract, Trust and Environment

Indicators	Exploratory Factor Loading	Measurement Model		
		Standard coefficient	R^2	t-values
Contract measurement model (model fit: χ^2 =26.62, df=17, NFI=.970; CFI=.991; TLI=.985 RMSEA=.052				
Marketing Contract (Cronbach's alpha =.818)				
Price is pre-arranged with my buyer [b]	.649			
Quality is pre-arranged with my buyer	.641	.697	.49	
Volumes are pre-arranged with my buyer	.675	.640	.41	7.313
Delivery time are pre-arranged with my buyer	.730	.882	.78	8.098
Delivery place are pre-arranged with my buyer	.766	.776	.60	8.143
Package is pre-arranged with my buyer[a]				
Production Contract (Cronbach's alpha = .899)				
I and my buyer use written contract [b]	.628			
My buyer provides me seed/seedlings. [b]	.566			
My buyer provides me chemical fertilizer.	.836	.923	.85	11.053
My buyer provides me pesticides.	.885	.996	.99	11.242
My buyer provides me field management.	.761	.633	.40	
My buyer provides me general technical assistance.	.919	.767	.59	14.410
Trust measurement model (model fit: χ^2 =47.591, df=26, NFI=.924; CFI=.963; TLI = .936, RMSEA=.063				
Trust in Reliability (Cronbach's alpha =.835)				
This buyer I trade with have a good reputation.	.764	.766	.59	
My previous relationship with this buyer are satisfactory.	.718	.724	.52	9.931
I expect this buyer to be working with me for a long time. [a]				
This buyer have been fair in his/her negotiations with me.	.644	.656	.43	8.983
This buyer is trustworthy.	.716	.756	.57	10.330
Promises made by this buyer are reliable.	.641	.676	.46	9.260
This buyer provides information that later turns out to be incorrect. [a] (reverse).				
Trust in Benevolence (Cronbach's alpha = .742)				
This buyer has made sacrifices for me in the past.	.594	.591	.35	6.734
This buyer cares for my welfare.	.672	.676	.46	7.354
In times of delivery problems, this buyer has been very understanding[a].				
Though circumstance change, we believe that	.647	.631	.40	7.058

this buyer will be ready and willing to offer me assistance and support.				
This buyer understands our problems.	.615	.692	.48	
This buyer will always follow his own interest[a].(reverse)				
This buyer is not interested in the quality of my life but in the quality of my products[a]. (reverse)				
Environment measurement model(model fit: χ^2 =51.446, df=18, NFI=.953, CFI=.969; TLI =.951 RMSEA = .075)				
Environmental diversity (Cronbach's alpha = .725)				
There are many growers for similar products in the market.				
This buyer is crucial to my performance.	.594	.606	.37	
I am dependent on this buyer for sales.	.927	.931	.87	6.058
I do not have a good alternative to this buyer.	.561	.651	.42	7.132
This supply market is very competitive. [a]				
We have only a few buyers for this product in the markets. [a]				
If I stop cooperation with this buyer, I will soon find another buyer. [a]				
Environmental Volatility (Cronbach's alpha = .773)				
I am often surprised by the high volatility of prices of my products in the market. [a]				
The demand for my products is unpredictable.	.831	.712	.51	
The varieties of my products has been significantly changed over the past five years. [a]				
The production technology has been significantly changed over the past five years. [a]				
It is difficulty for me to forecast the markets.	.753	.887	.79	2.203
In recent years, product sales is getting more difficulty. [a]				

[a] items dropped after Exploratory Factor Analysis.

[b] Items dropped after Confirmatory Factor Analysis.

All t-values are significant at $p < 0.05$ Level.

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